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MONTANA LASA (LARGE APERTURE SEISMIC ARRAY) OPERATION
(U) FORD AEROSPACE AND COMMUNICATIONS CORP BILLINGS MT
ENGINEERING SERVICES DIV 11 JUL 78 2145-78-110
F08606-78-C-0003

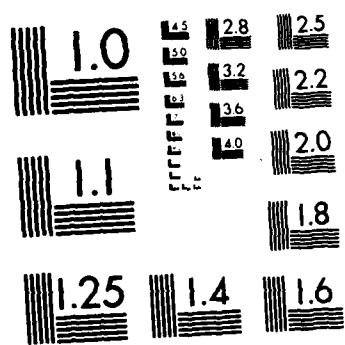
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MICROCOPY RESOLUTION TEST CHART
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MONTANA LASA OPERATION TECHNICAL REPORT
FOR JUNE 1978

APPROVED FOR PUBLIC RELEASE
DISTRIBUTION UNLIMITED

July 11, 1978

NOV 25 1983

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Report No. 2145-78-110

AFTAC Project Authorization No.: VT/8708

Contractor: Ford Aerospace & Communications Corporation

Date of Contract: 01 October 1977

Amount of Contract: \$525,479.00

Time Period Covered by Report: June 1978

Contract No.: F08606-78-C-0003

Contract Expiration Date: 30 September 1978

Program Manager: R. E. Atkins (406)245-6332

Title: Montana LASA Operation

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MONTANA LASA OPERATION

The Montana Large Aperture Seismic Array (LASA) operations under project VELA T/8708 during June 1978 are described in this report. Operation of the LASA provides data to the seismic community through the Seismic Data Analysis Center (SDAC) and supports the Defense Advanced Research Projects Agency (DARPA) objective to demonstrate the utility of large seismic arrays in the detection and discrimination of earthquakes and underground explosions. Ford Aerospace and Communications' Engineering Services Division (ESD) personnel in Montana are responsible for the LASA project's objectives.

I. Operations Summary

The LASA Data Center's (LDC) 360 computer system was on line with the array data available for SDAC 99.0% of June. The data link between the LDC and SDAC was terminated at 2400 UTM on 30 June 1978.

Fast-mode digital data recording, which began in April, continued until the data communications service from the subarrays was discontinued on 30 June (2400 UTM.)

Teleseismic and near-regional event processing and reporting covered events detected throughout the month.

II. Areas of Concern

None

III. Problems Encountered

None

IV. Future Plans

1. Define and commence the tasks associated with the LASA roll-up and termination activities.
2. Document the seismic data processing studies in progress prior to June 30, the date of data shut down.

ATTACHMENT I

**MONTANA LASA
SPECIAL OPERATING REPORTS
FOR
JUNE 1978**

Special Operating Reports of the activities and operations at the Montana LASA have been prepared in accordance with CDRL Data Item A003 and are attached. This month's reports include:

- 1) LDC Operations Summary with the**
Data Interruption Log
Subarray Data Communications Outages
- 2) LASA Maintenance Activities with the**
Defective Signal Channel Status Report
- 3) LDC Seismic Data Analysis Activity with**
Teleseismic Event Confirmation Status, 1977

LDC OPERATIONS SUMMARY FOR JUNE 1978

A.

LASAPS Operational Statistics

	JUNE 1978		VT/8708	
	Hrs.	%	hrs.	%
Data Available	713.1	99.04	6317.0	96.41
4.8 Kb Line Down	0.0	0.00	6.0	0.09
Preventive Maint.	0.0	0.00	11.6	0.18
Awaiting Maint.	0.0	0.00	106.0	1.62
Corrective Maint.	0.0	0.00	74.1	1.13
Awaiting Parts	0.0	0.00	12.1	0.18
Halt/Power Outages	6.0	0.83	18.8	0.29
Other	0.6	0.08	5.7	0.09
Other LDC Equip. Down	0.4	0.05	0.9	0.01
TOTALS	720.0	100.00	6552.0	100.00

SUMMARY

LDC on-line	713.1	99.04	6319.3	96.45
4.8 Kb Line Operation	720.0	100.00	6546.0	99.91
360 Operational	720.0	100.00	6347.5	96.88

B.

PDP-7 Computer System

Data recording covered 97.38% of the month by 701.2 hr of fast-mode recordings. The total tape usage came to 2104 f-m tapes. The tape library has decreased from the 60 plus days of retention to a 28 day retention.

Array off-line operations required 17.0 hr (2.36%) and downtime totalled 1.8 hr (0.25%). The PDP-7 computer was operational 720.0 hr (100.00%).

C.

Programming

JUNE 1978 VT/8708

New Programs Initiated	0	10
New Programs Completed	0	9

Completed

EDIT DUP VER VL2, 11/77
DGAV V1, 1/78
NOISE PROGRAM (VLL), 2/78
CAL LP (VLL) 3/78
LIST EP77 (VLL), 4/78
AUTO EDIT (VL5), 4/78
FMEDIT (VLL), 5/78
AUTO EDIT (VL6), 5/78
APPLE (VL5), 5/78

In Progress

STACK (VLL)

CODE: 1-TELCO, 2-SITE FAILURE, 3-LMC
MAINT., 4-LDC CHECKING, 5-POWER,
6-LDC FAILURE, 7-OTHER

JUNE 1978		MONTANA		DATA INTERRUPTION LOG				
DATE	SITE	GMT TIME OUT	IN	DURATION HRS. MIN.	TICK #	TELCO INIT.	LASA INIT.	REMARKS
6/6	D4	1527	1537	0 08				3 ADJ SP
6/8	B4	2043	0445	8 02	6-040			1 Dead
6/9	C1	2043	0420	7 37	6-039			1 Dead
6/14	C3	0105	1706	16 01	6-118			1 Dead
6/15	D1	0148	1818	40 50	6-127			1 Dead-Storm (bad Road)
6/15	C3	0240	2135	18 55	6-108			1 " " "
6/15	B2	1913	2015	1 02				1 Testing
6/23	C2	1328	1515	1 53	7-001			1 Broken Data
6/24	D4	0750	0900	1 10	7-002			1 " "
6/24	C2	0953	1900	9 07	7-003			1 Lost Data
6/25	D2	0205	0302	57	7-018			1 Lost Data
6/26	D2	1816	1927	1 11	7-020			1 Lost Data
6/26	C3	1824	1649	22 25	7-021			1 Bad Data
6/27	D4	0135	0309	1 34	7-027			1 Broken Data

MONTANA LASA SUBARRAY DATA COMMUNICATIONS OUTAGE REPORT
FOR JUNE 1978

The following outages for the month of June 1978 that exceed two hours are:

<u>Date</u>	<u>Site</u>	<u>Circuit</u>	<u>GMT Out</u>	<u>GMT In</u>	<u>Duration</u>	<u>Telco Reason for Outage</u>
6/8-9/78	B4	2707	2043	0445	8:02	DEAD
6/8-9/78	C1	2708	2043	0420	7:37	DEAD
6/14/78	C3	2711	0105	1706	16:01	DEAD
6/15-16/78	D1	2714	0148	1818	40:50	DEAD-Storm-Bad Roads
6/15/78	C3	2711	0240	2135	18:55	" " " "
6/24/78	C2	2709	0953	1900	9:07	Lost Data
6/26-27/78	C3	2711	1824	1649	22:25	Lost Data

LASA MAINTENANCE ACTIVITIES FOR JUNE 1978

A. LDC Systems

	<u>360</u>	<u>PDP-7</u>	<u>DIGITAL</u>	<u>ANALOG</u>	<u>TEST/SUPPORT</u>	<u>TOTALS</u>
Corrective	0	4	1	5	4	14
Preventive	0	12	3	0	0	15

Work Orders: 13 initiated, 65 completed, 0 backlog

Maintenance Actions Completed: 31

B. Array Systems

	<u>SP</u>	<u>LP</u>	<u>SEM</u>	<u>POWER</u>	<u>MET</u>	<u>TOTALS</u>
Corrective	6	1	0	2	0	8
Preventive	8	0	4	4	0	16

The 6 field trips into the array covered 9 subarray visits.

Work Orders: 6 initiated, 57 completed, 0 backlog

Maintenance actions completed: 31

C. Modifications

Modifications completed: None

D. Shop Repairs: RA-5 Amplifier, 1 ea; Lincoln Lab.
Printed Circuit Cards, 2 ea.

TOTAL: 3

E. Utility

Work Orders Completed: 4 land, 1 facility and 1 vehicle

Landowner visits: 8

Vehicle mileage: 1916 miles

MONTANA LASA DEFECTIVE SIGNAL CHANNEL STATUS

SITE	WORD SENSOR	SYSTEM				DAY						REMARKS	
		SP	LP	JBAR	MET	S	M	T	W	T	F	S	
WEEK ENDING 03 JUNE 1978													
AO	1143	X							B	*	*		
B2	1784	X							H	H	H		
B3	2055	X							L	L	L		
B4	1253	X							L	L	L		
AO	1263	X							D	D	D		
D3	2611		X						H	H	H		
C4	0972	X							B	*	B		
D3	2346	X							B	B	B		
WEEK ENDING 10 JUNE 1978													
AO	1143	X				*							
B2	1784	X				H	H	H	H	H	H	H	
B3	2055	X				L	L	L	L	*	*	*	
B4	1253	X				L	L	L	L	L	L	L	
AO	1263	X				D	D	D	D	*	*	*	
D3	2611		X			H	H	H	H	H	*	*	
C4	0972	X				B	B	B	*	*	*		
D3	2346	X				B	*	B	*	*	*		

LEGEND

B = DISTORTED
 D = DEAD
 H = HIGH GAIN
 I = INTERMITTENT
 L = LOW GAIN
 N = NOISY
 O = OFFSET
 X = SEE REMARKS

NOTES

I. CONSULT LATEST ARRAY STATUS REPORT (AS) FOR IDENTIFICATION OF CHANNEL EQUIPMENT.

MONTANA LASA DEFECTIVE SIGNAL CHANNEL STATUS

LEGEND

B = DISTORTED

**B = BISITE
D = DEAD**

H = HIGH GAIN

H = HIGH GAIN
I = INTERMITTENT

I = INTERMITTENT
L = LOW GAIN

L = LOW
N = NOISY

N = NOISE
O = OFFSET

X = SFF REF

NOTES

I. CONSULT LATEST ARRAY STATUS REPORT (AS) FOR IDENTIFICATION OF CHANNEL EQUIPMENT.

WEEK BEGINNING: DAY 1-30 MONTH JUNE YEAR 1978
DSCS-1

LDC SEISMIC DATA ANALYSIS ACTIVITY FOR JUNE 1978

I. Event Classification and Reporting

A. Teleseismic Processing

During June 29 daily teleseismic reports indicated the LASA seismic activity as classified below:

	<u>JUNE 78</u>	<u>VT/8708</u>	<u>SINCE JANUARY 78</u>
Located Events, <104°	170	1879	1308
Located Events, >104°	7	71	46
Unlocated Regional	1	20	17
PKP	37	432	240
Poor Arrivals	60	529	357
pP	36	478	408
Other Phases	18	170	108
Unprocessed Detections	223	2341	1602
TOTALS	552	5911	4086

B. Near-regional Processing

During June, 4 reports indicated the seismic activity shown below:

	<u>Near-regionals</u>	<u>Strip-mine Blasts</u>
LDR -13 05/26-06/09	7	-
LDRs -12 05/26-06/09	-	116
LDR -14 06/09-06/29	7	-
LDRs -13 06/09-06/29	-	166
JUNE 1978 TOTAL	14	282
VT/8708 TOTAL	172	2325

TELESEISMIC EVENT CONFIRMATION STATUS, 1977

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
NO MAGNITUDE REPORTED												
PDE	115	89	116	103	91	121	88	105	88	109	189	125
LDC & PDE	1.3	15	12	11	23	15	14	22	23	15	34	24
% LDC REPORTED	10.2%	14.4%	9.4%	9.6%	20.2%	11.0%	13.7%	17.3%	20.7%	12.1%	15.2%	16.1%
Mb \leq 4.5												
PDE	28	20	36	37	46	31	32	33	25	37	33	38
LDC & PDE	36	22	30	45	31	44	42	43	40	28	31	41
% LDC REPORTED	56.3%	52.4%	45.5%	54.9%	40.3%	58.7%	56.8%	56.6%	61.5%	43.1%	48.4%	51.9%
Mb \geq 4.6												
PDE	86	78	142	165	92	86	91	72	77	104	80	67
LDC & PDE	174	130	152	156	178	179	148	254	206	230	219	192
% LDC REPORTED	66.9%	62.5%	51.7%	48.6%	65.9%	67.5%	61.9%	77.9%	72.8%	68.9%	73.2%	74.1%
PDE TOTAL	229	187	294	305	229	238	211	210	190	250	302	230
PDE & LDC TOTAL	223	167	194	212	232	238	204	319	269	273	284	257
% LDC REPORTED	49.3%	47.2%	39.8%	41.0%	50.3%	50.0%	49.2%	60.3%	58.6%	52.2%	48.5%	52.8%

Based Upon 1977 PDES Thru # 22

END

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